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THE TWENTY ELEMENTS OF INSTRUCTIONAL TELEVISION.

BY- MCBRIDE, JACK

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THIS PAPER WAS PRESENTED AT THE ELEVEN NATION UNITED ARAB REPUBLIC SEMINAR ON EDUCATIONAL TELEVISION SPONSORED BY THE CENTRE FOR EDUCATIONAL TELEVISION OVERSEAS (CAIRO, EGYPT, FEBRUARY 6-12, 1966). IT PURPOSES ARE TO DISCUSS THE POTENTIALS OF TELEVISION TO SOLVE SPECIAL EDUCATIONAL NEEDS, AND TO PRESENT 20 ELEMENTS WHICH THE AUTHOR BELIEVES ARE VITAL TO THE SUCCESSFUL USE OF TELEVISION IN EDUCATION. THESE ELEMENTS INCLUDE--(1) THE EDUCATIONAL NEED, (2) THE TELEVISION TEACHER, (3) CURRICULUM AND LESSON PLANNING AND SUPPORT, (4) THE TELEVISION LESSON, (5) SUPPORTING PRODUCTION, (6) THE TELEVISION MEDIUM, (7) TELEVISION ORIGINATION EQUIPMENT, (8) TELEVISION DISTRIBUTION SYSTEM, (9) GENERAL ADMINISTRATIVE SUPPORT, (10) LOCAL ADMINISTRATIVE SUPPORT, (11) THE CLASSROOM TEACHER, (12) TEACHER UTILIZATION, (13) SYSTEM OF INFORMATION DISSEMINATION, (14) SUPPLEMENTAL INSTRUCTION MATERIALS, (15) THE TELEVISION SET, (16) THE RECEPTION SETTING, (17) RECEIVER MAINTENANCE AND REPAIR, (18) THE STUDENT, (19) FEEDBACK TO THE STUDIO, AND (20) RESEARCH AND EVALUATION. THE AUTHOR CONCLUDES THAT THE ELEMENTS PRESENTED ARE NOT MEANT TO BE A CHECKLIST, BUT RATHER A MEANS OF STRENGTHENING EXISTING PROGRAMS OR DESIGNING BETTER INITIAL EFFORTS. (JM)

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The Twenty Elements of Instructional Television

A paper presented at the Eleven Nation United Arab Republic Seminar on Educational Television sponsored by the Centre For Educational Television Overseas, Cairo, Egypt, February 6-12, 1966.

Jack McBride, Director of Television
and General Manager, Station KUON-TV
University of Nebraska.

General Manager, Nebraska Educational
Television Commission
Lincoln, Nebraska

We now have over 15 years experience in the systematic use of television in formal education. By this time, television is an integral part of the formal educational process of many countries. A number of the older, more established nations are using television at every educational level: pre-school, elementary, secondary, collegiate, professional and adult. They are using television to assist in the improvement of instruction, to solve special educational needs such as shortage of qualified faculty or to expand the curriculum through addition of specialized courses or to address the problem of illiteracy or health. The developing nations are turning to the use of television because of the need to teach more and faster, and because television through its mass appeal can provide immediate and economical educational assistance.

Educational psychologists and researchers have devoted major attention to the use of television in formal education. It is possible that in the entire history of education no single facet has been subjected to as exhaustive testing and experimentation and

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research as has educational television. There is much we know about the successful employment of television in education. We learn more with each passing semester and are better able to harness this powerful medium of communication called television for specific educational purpose.

Unfortunately, schools television is a complex undertaking. It can be mistreated and misused. Instead of providing the highly satisfactory achievements of which it is capable, it can prove unproductive, mediocre, even wasteful, if not used properly.

In the United States, I have been fortunate to participate in this exciting field of educational television since its inception. In the State of Nebraska we have been privileged to employ television for educational purposes since the early 1950's. Nebraska is some 500 miles wide. It is an agricultural state with heavy concentrations of population in its cities and with many rural communities containing small populations which do not have vast educational resources readily available to them. We, therefore, are developing a statewide system of educational television transmitters to serve the students and adults of our state.

Because of our pioneering efforts, I have been presented the opportunity to travel throughout the United States and assist other school systems and universities in establishing educational television systems. In these many situations, a wide range of problems confronting the educational application of television was encountered. Over the years, certain problems kept recurring. It became more and more clear that certain elements were identifiable -- regardless

of the base situation in which schools broadcasting was to be employed. In succeeding years, during participation in the First International Conference on Schools Broadcasts in Rome, and then the Second International Conference in Tokyo, and during consulting assignments in Nigeria, the Philippines and in Canada, I became more and more certain that a number of specific elements could be identified as vital to successful use of television in education. The following presentation is the result of this collective thinking and of these many years of involvement with the use of television in the formal educational process. It is offered for your consideration as you undertake initiation of a new educational television program, or consider the improvement of an existing schools broadcasting effort.

I submit to you that there are 20 elements vital to the successful use of television in education -- regardless of the level of education, the type, the country, the specialized needs and problems. Twenty elements must be present and operative, whether we are considering the use of instructional television in the bush country of western Nigeria, the suburbs of Manila, the island chain that forms American Samoa, the metropolitan schools system of Colombia, South America or New York City, the public and separate school systems of Alberta, Canada or the rural schools in the State of Nebraska. It makes no difference where we start in the process of identifying these 20 elements; the priority or sequence is unimportant.

What is important is that all 20 be present in the formal educational setting. We could start anywhere; I will start with my number one. I will return to this point later and explain in further detail.

What are the 20 elements of successful instructional television? They are as follows:

1. The Educational Need. Decisions must be made by appropriate authorities as to the educational problems to be solved through the use of television. Those with prime responsibility must determine for themselves, as well as the educational system, the nature, the extent, the current status of the educational problem. Parameters must be established if television is to serve effectively. There must be a clear definition of the educational problem to be solved, of the need to be fulfilled through the use of television.

In far too many instances, educational administrators have been captured by the glamor of television, by its great potential. These educational executives have made the basic decision to employ television, and thus have committed considerable expenditures of funds without first clearly defining the problem which needs solution. While television can be useful in a great variety of educational situations, it is not universally helpful. In certain situations television might prove costly or educationally unsound. Indeed, there might be a better way to address the problem using certain other of the educational electronic media. In far too many instances has the television cart been put before the educational horse. Commitments have been made for the installation of elaborate television systems. Only after capital expenditures have been incurred and television staffs are on duty have these administrators

belatedly addressed themselves to the problem of how or why television should be used.

A definition of the educational problem to be solved through the use of television is clearly an important element, if instructional television is to succeed. In my view, delineation of need is extremely important and thus heads the list of elements.

2. The Television Teacher. In any instructional use of television, it is obvious that a television teacher -- the preparer and presenter of the television lesson -- is an essential element. However, in too many instances insufficient attention has been given to the selection of the particular person or persons to serve in this capacity.

What have we learned in these past 15 years about the television teacher? We know the teacher must first of all be a subject matter specialist, one quite knowledgeable about the subject to be taught, a person most familiar with the academic discipline under consideration. Ideally, this person should also have considerable experience as a teacher, experience in classroom instruction via traditional pedagogical methods. For this teacher will be called upon to remove himself from the four-walled classroom as we know it to an artificial studio situation filled with mechanical and electronic gadgetry. In this foreign situation, deprived of eye contact with the subjects of instructions and faced with the constant distraction of technicians performing seemingly unrelated tasks behind cameras and other television equipment, the teacher is called upon to

provide effective instruction.

In addition, this television teacher must be an experienced communicator, one who can present ideas and concepts and formulae and theorems effectively, vividly, forcefully. This teacher must motivate and stimulate and be understood. Ideally, this studio teacher should also have a knowledge of the medium of television, and appreciate its advantages and disadvantages. For only with this knowledge can a person capably use the medium to provide effective instruction.

Several other points about the television teacher. Personality is important. The television teacher must transcend the camera and tubes and screen to appear vibrant and real to the student -- not handsome or glamorous, as the case may be, but personable. We have learned that not every effective classroom teacher has the transfer capability to become an effective television teacher. However, the converse is true; every good television teacher is an excellent classroom instructor.

Through the use of television in education, we have an excellent opportunity to seek out the most gifted teachers, the best possible instructors. For with educational television we can bring many, many students under their influence. This is one of the great advantages of schools broadcasting. In one semester or one class period can a master teacher influence far more students than he could possibly reach via years of traditional teaching. Therefore, it is important to spend deliberate effort in audition, in screening, in careful selection of the best possible television

teachers. Unfortunately, in too many instances where television is employed, this is not the case. In too many situations, for reasons of expediency or because a teacher could not readily be relieved of other duties, have educational administrators settled for less than the best. Unfortunately, television magnifies this mediocrity. Since the television teacher is so important to the successful use of television in education, major attention should be addressed to selection of the very best.

Attention must also be devoted to providing the television teacher, once selected, with sufficient time to prepare and present the finest television classes. In too many situations have administrators failed to recognize the many hours needed for television program preparation and have insisted that the television teacher continue to assume other teaching duties. These other assignments distract from preparation of the finest possible television instruction. And is not optimum teaching and learning our goal? In the more advanced ITV applications, the television teacher is provided research and secretarial support; this is to be commended.

3. Curriculum and Lesson Planning and Support. Because of the importance of the television instruction to the parent educational process, because the teaching has broad applications and wide-spread effects, and because of the nature of instructional television itself, the content of an educational television program is rarely planned solely by the television teacher. Television is an encourager of the team teaching approach. The television teacher

ordinarily plans broad course and individual program content in concert with his peers and superiors. At the primary educational level, this means workshops and planning meetings where fellow classroom teachers from representative schools join the television teacher, curriculum specialists and supervisors and the television producer cooperatively to plan the broad course outline and general program content.

At the secondary or high school level the television instructor again plans course and lesson content cooperatively with his fellow teachers and academic supervisors. Even at the collegiate level there is ordinarily found a certain involvement in course structuring and planning by fellow academicians in a given discipline. Because the television instruction ordinarily deals with lower level and fundamental courses and because the televised lessons are frequently designed for repeated use over a number of semesters, the lecture and course content is devised by the television professor in concert with his academic colleagues and the departmental chairman. Even at the collegiate level, television motivates less autonomy of instruction and greater collaboration. Therefore, the involvement by and participation of various academic interests in the broad planning of development of the television course is an important element. In summary, the television teacher is afforded the benefit of the best thinking of a team of educationists and content specialists, and can translate this collective advice into specific program units designed to provide optimum instruction in the given circumstance.

4. The Television Lesson. The instructional unit which is to be distributed over the television system, the television lesson itself, is an obvious but important element in our electronic instructional process. Those planning the television instruction must answer a number of questions in this regard. Is the schools broadcasting to provide total teaching? Or is it designed to complement other instruction? Is the television lesson complete in itself? Does it provide the complete teaching experience, or is it planned as an adjunct to the classroom teacher, (or other educational media instruction)? Is the television unit designed as direct teaching -- an integral part of the instruction without which proper learning cannot take place. Is it designed as supplemental instruction secondary to the primary instruction provided by the local teacher? Is the television unit planned for enrichment usage wherein a local teacher has the option to use or not at his own discretion? Or for remedial instruction? What is the length of the television lesson? Ten minutes? Thirty minutes? Fifty minutes? What is the frequency of television lesson distribution? One television unit per week? Every other week? Three times per week? Daily? How many instructional units comprise the television course? These questions relate directly back to the educational need we have defined. Answers must be forthcoming from the curriculum and content team described as the third element.

The subject matter and other academic factors, not television

considerations, should determine television lesson and course length and frequency of presentation. The interest span of beginning students varies considerably from that of advanced learners. The needs of teaching science can vary considerably from those of language. As a result, we are finding every conceivable variation in lesson length and times of presentation. The role and relationship of the television lesson must be determined at the outset, if successful use is to be made of television.

5. Supporting Production Staff. Anyone with the slightest acquaintance with the television process is aware of the fact that a television presentation depends heavily upon supporting production and technical personnel. The quality of the television program is measured in direct proportion to the experience of the production team. Heading the production crew is a television producer, an experienced communication specialist, who can assist the television teacher in most appropriately using this medium of communications. Frequently production and direction functions are combined in one man. The relationship of the producer/director, who is the communication specialist, to the television teacher, who is the content specialist is a critical one. An optimum product is produced when each has the complete respect and confidence of the other, and the two function as a team.

Supporting this team is a complement of television production and technical specialists: cameramen, audio controllers, video technicians, telecine operators, staging and lighting personnel,

artists, photographers, etc. A television lesson cannot be effective without a capable production staff. Different types of television presentations demand differing numbers of technicians. Certain programs can be produced very simply, with little staging and equipment and few supportive staff; others require more elaborate crews and equipments. The layman or outsider little appreciates the complicated mechanism that is called television, nor the role of the behind-the-camera specialists. These people need time to function as a unit with the television teacher. And this means providing time for advance planning and preparation time for program design, and certainly time in the studio for rehearsal. And this brings us to the next element.

6. The Television Medium. This marvelous invention -- this medium of communication we call television -- is certainly an important element in the instructional television process. It has a wealth of potential. It has disadvantages as well as advantages; limitations as well as capabilities. Those who employ this medium must be well versed in its limitations and capabilities; must employ its inherent assets to the fullest.

Consider for a minute the focusing advantage of television. The television teacher has the opportunity to direct the student's attention specifically to the desired information. For the student sees only that which appears on the television screen; that which has been specifically structured. What a marvelous advantage this is! Consider the fact that the television teacher has a

one-to-one relationship with his student -- that he talks specifically and solely to each student at every television set. This direct eye contact enables a personal relationship between student and teacher impossible in a traditional learning situation, except by the tutorial method. Consider television's ability to provide at an instant an extreme closeup of any object. Students in the rear of the classroom or auditorium have as much access to the specimen and demonstration as have those in the front of the room. Every student has a front row seat. Add to this the capability of superimposing one word or picture over another, thanks to the electronic process. Here is the opportunity to provide dynamic learning reinforcement.

The television teacher has the opportunity, at any given instant, to fill the screen with appropriate slides, pictures, films or film segments; or for that matter, with any visual information recorded on videotape or any means of storage. Music and sound effects are available at the touch of a button. One visual can contrast with another by means of a jump cut; one picture can dissolve into another to stress relationship. Animation is possible. The television screen can be split to direct attention to two images -- both a full shot showing the complete mechanism, and an extreme closeup of a selected part. Various methods of staging and of presentation can enhance the instruction.

The television teacher and producer director have every

opportunity to be creative and to use the medium of television to its fullest in support of their objective. One word of caution, however. It is all too possible to become entrapped in the magic of television, and to over-use television's gadgetry and devices to the extent that learning becomes secondary to the television performance.

7. Television Origination Equipment. With the television lesson ready for presentation and the teaching talent in the studio, we must next have television production equipment available to originate the telecast. Studio equipment can range from a simple one-camera chain to very elaborate television studio facilities. Different types and models of cameras and camera mounts have differing capabilities and flexibilities. There are many approaches to video control equipment, to audio pickup and audio control equipment, to telecine equipment, to television recording systems, to lighting and lighting control units. With the rapidly changing state of the technical art, television equipment can present a particular problem. Studio sizes will vary greatly. A wide range of staging devices and scenery units is available. Television presentations can be mounted with the simplest equipment; others demand extensive facilities and equipment. Because television is a highly technical medium, the advice of experts is needed. Too frequently do educators, completely out of their element in this world of orthicons and vidicons and plumbicons, fail to seek such counsel. Too frequently also do educational

administrators make the mistake of activating a small television system, only to find that their needs and the demand for quality necessitate additional facilities. But whatever the approach, adequate television origination equipment is mandatory. And such equipment must be in good repair and on a regular basis capable of producing quality aural and visual signals.

8. Television Distribution System. With the educational need identified, with the television teacher selected, the television lesson planned, rehearsed and ready for presentation, some means of distribution is essential if the lesson is to be carried from the point of origination to the classrooms. Here again various approaches are employable, depending upon needs. Most prevalent of the distribution systems is the broadcast station, whether operating on a Very High or Ultra High frequency. Various transmission powers are possible, as are makes of transmitter and antenna and structures to raise the antenna from the ground. These variables combine to determine the coverage area of the television station. We see stations broadcasting with maximum power permissible, and many operating at low and intermediate powers.

Closed circuit television is a means of distribution rapidly developing in educational circles. Here, airwaves are not used for transmission; rather is coaxial cable employed. And only those television sets physically interconnected with the point of origination are capable of receiving the program. One advantage

here is that multiple lessons can be sent over the same cabling at one time. A closed circuit system can be as simple as one camera used by a professor to magnify a specimen for students watching one television receiver. Elaborate closed circuit systems are possible as well. In South Carolina, virtually all of the secondary schools in the State are connected by means of a closed circuit network.

Airborne television is another means of distribution -- granted an elaborate and expensive one. However, it is technically feasible and practical to operate a television station from an airplane and thus increase the coverage area many fold.

In the United States considerable attention is being given to yet another distribution system -- the point-to-point broadcast or fixed broadcast service operating on the 2500 megacycle band. In this instance, low power, low cost television transmitters are beaming signals over the airwaves to television sets with specialized reception equipment. Only those sets equipped with special reception devices can receive the signal, however. This means of distribution is far less costly than broadcast television, if the coverage area is a restricted one. It is also possible for one operator to program several channels concurrently. The Roman Catholic school system in New York City is at present equipping each of its school buildings and will soon program five channels for instructional purpose.

Administrators should make sure that distribution systems

are planned in direct response to educational needs, are designed to take fullest advantage of the technical art, and are planned adequately to handle predicted expansion as well as current needs. Too frequently in the past have educators expended major capital funds for television systems later proven to be unsuited to their needs, purchased equipment obsolete upon installation, and paid the price of limited planning.

In the case of use of transmitters under the administrative control of an agency, possibly a Ministry of Information, other than the educational system proposing the use of television, prime attention should be given to insuring that specific hours are made available for schools telecasting and that the time periods reserved are provided on a regular basis.

Administrators must consider the expansion of distribution systems beyond a singly transmitting unit. Chains of stations can be established; networking is of prime importance to those responsible for statewide educational needs. Satellite or slave stations programmed from a master station and operated by remote control make schools television possible on a broad scale. Ministries of Education and Information frequently have access to such national systems of transmission, and thus have an excellent opportunity for educational accomplishment. Whatever the distribution system, it too, must be of sufficient quality and performance as regularly to distribute television lessons to the classrooms on schedule. Nothing will negate the value of schools

broadcasting faster than technical difficulties preventing reception of the scheduled television lesson at the exact time the classroom teacher has prepared her class to receive it.

9. General Administrative Support. Many of the preceding elements are obvious; this next is as well. Yet it is surprising how many problems can develop in this area. Whatever the educational unit using television, be it an individual school system, a single college or university, or a number of schools in an educational compact, for effective instructional television there must be general administrative approval and support from central administration. This may be a board of education, a board of trustees or regents, a state department of public instruction, a ministry of education or another governmental unit. Unless general approval and support, both moral and monetary, are forthcoming, those charged with the responsibility of operating schools broadcasting on a day-to-day basis will find themselves thwarted. The results will reflect this lack of administrative support. Schools broadcasting is a costly venture; major capital investments must be made for origination and reception equipment, and operational expenses are considerable. But governing authorities must make more than financial decisions to insure appropriate use of television. Policy decisions must be made regarding teacher employment and other staffing needs, general course selection, the curriculum, and the relationship of the schools programming to the total educational effort. A favorable attitude from top administration

will influence all aspects of the educational system and enable the television instruction to become integral to the broader educational endeavor, not peripheral. A critical look at television usage both across the United States and in other countries as well indicates conclusively that television is being employed most effectively and educational achievement is the greatest when the televised instruction is contained in the mainstream of the broader educational process, when the schools telecasting is directly related to the curriculum. Without the general endorsement of the appropriate governing bodies and chief administrations, the instructional television program can operate, but will be decidedly less effective.

10. Local Administrative Support. The same can be said of support from supervisory personnel at the intermediate level. The school principal, the departmental chairman, the local building administrator more immediately responsible for the use of television should be fully knowledgeable about the television project, its objectives and reasons for use. He should be involved considerably in the television process. Certainly his approval and full support is mandatory to successful ITV. For it is at this level of administration that scheduling information and notices of program change are received and which must be distributed to all the teaching personnel under his command. This is the supervisor to whom the individual classroom teachers using television should report problems and discuss improvements. This is the individual who

supervises the school unit and is thus essential to the change of instructional television being developed.

11. The Classroom Teacher. The classroom teacher, administering the instructional setting in which television enters, is an extremely important link in the instructional television process. The local teacher's attitude toward television and his manner of use have much to do with the success or failure of schools television. Research studies have shown conclusively that the attitude of the reception teacher substantially influences students' acceptance of television. If the local teacher feels television instruction to be an intruder in his classroom, his attitude and actions will so reflect and will inevitably be observed by his students. If, on the other hand, the classroom teacher regards the television teacher as a partner, a co-instructor, television can be most meaningfully employed in that classroom.

The reception teacher's role in a television classroom should be active rather than passive. He should not feel that the entrance of television will make his job easier. Television will not enable the teacher to rest, or correct papers, or conduct other activities unrelated to the immediate instruction. On the contrary, television will demand more of the local instructor. Television requires that the classroom teacher be even more effective, imaginative, motivative. For it is the responsibility of the classroom teacher to determine the most appropriate and effective pre-television activity for his class, to acclimate his students

to the point of greatest receptivity, to develop his students so that the television lesson is a logical progression of instruction.

The local teacher has a key responsibility for determining how best to employ himself during the telecast period. Here is an opportunity for the teacher to provide individual counselling and instruction, to direct attention to individual differences, to observe and help those few students whose quizzical looks indicate obvious difficulty in understanding the television instruction.

The classroom teacher must also determine how best to use the post-television period, how best to take his class, once the television set has been switched off, and extend their learning.

It is of critical importance that each teacher making use of television be fully instructed in the proper tuning of the television receiver. In addition to turning the television set on and off, each teacher must know how to correct minor reception problems such as picture roll-over, how to fine-tune the set to insure the best quality picture. In far too many classrooms where television is used, students are subjected to an inferior quality picture and sound, simply because the television teacher has not been trained to get the most from his receiver. Learning will obviously be affected.

12. Teacher Utilization. All too frequently has the mistake been made of assuming that the classroom teacher automatically knows how to use television. Nothing could be further from the truth. Therefore, teacher training in television utilization is

inserted as a very vital element. Because the local teacher is so important to the schools broadcasting process, specific attention must be devoted to the problem of training teachers to use television. This is a two-pronged problem: teachers already in service must be given instruction prior to the introduction of television in the classroom, and must be given continuing counsel thereafter; and students in the teacher education programs of the higher educational institutions must be instructed in the medium. This means that those responsible for teacher education, our colleges and universities, should be involved in the instructional television project. The educationists should assist both future teachers and teachers already in the field in the most effective methods and techniques by which television can be incorporated into the classroom lesson. In too many instances have our teacher training institutions failed to exert leadership in emphasizing the communications media in education for today and tomorrow.

13. System of Information Dissemination. If instructional television is to be effective on a daily basis, there must be established an effective and regular system for disseminating information to every classroom teacher employing the medium, as well as all others involved. Advance program schedules must be established, and in the hands of each using teacher well in advance of such use. Information as to the inevitable changes, vacations, repeat broadcasts, etc., must be provided each using teacher, so that lesson plans can be developed accordingly. Admittedly, this is easier said than done. On a day-to-day basis, the communications

system can break down in even the most advanced metropolitan area. Consider the problems of information dissemination in the bush country of Nigeria. But unless a permanent system of information dissemination is devised and each using teacher kept advised, interest in the telecasts will rapidly wane. Once confidence in the television process is lost, it is extremely difficult to regain.

14. Supplemental Instructional Materials. In a great many cases, supplemental instructional materials are devised to accompany the television lessons. These take various forms. In some cases teachers guides are prepared in advance and are placed in the hands of the teachers prior to the beginning of the school term. These teachers guides contain such information as a complete schedule of broadcasts, a description of the content of each television lesson, suggestions for pre-television and post-television activities, a general course description, a commentary on the general approach and procedures to be employed, and other tangential information helpful to instructors.

In certain cases, supplementary instructional materials are prepared and placed in the hands of each student viewer. Included in these student guides is a variety of appropriate information designed to complement the television lesson and further the individual's learning experience. In several of the more refined schools broadcasting situations, visual materials accompany the student guides. In many instances the television course is designed to parallel a specific textbook. In each case, the supplemental materials are designed to reinforce, to augment, to add to the

learning experience. Obviously, the supplemental materials must be readily available to all using television instruction.

15. The Television Set. The entire instructional television process collapses without a reliable television receiver. All of the time, effort and money expended in planning and presenting the television lessons is wasted without a television set that is readily available and in good operating condition. Consideration must be given to a variety of reception factors: the type of television receiver to be employed, the size of the screen, the number of sets to be placed in the viewing room, the type of antenna necessary to insure good reception, the height each set must be from the floor to insure easy viewing, blinders for the reduction of light glare, portability versus permanence, the television stand or mount. Adequate wiring must be provided in each viewing room for the proper electrical outlets, or batteries will be required.

All too frequently is insufficient attention given to the television receiver. Yet it is as vital to the schools television process as the studio camera.

16. The Reception Setting. Because the physical setting in which television instruction is received is so frequently slighted, this is submitted as a separate element. Every consideration should be given to those factors which comprise the situation in which the students view and hear television lessons. Nothing is more frustrating to the viewer than to be forced to watch a screen containing glare from a window or door or artificial lighting. Glare should be checked from every viewing angle, and eliminated. In many cases,

the slight tipping forward or raising of the television set, or the use of inexpensive blinders will eliminate a glare problem and greatly increase viewing efficiency. In order to encourage notetaking, adequate lighting in the reception room is desirable. Special attention should be given to reducing the problem of extraneous hallway noise or noise caused by students in adjacent areas of the school. Television sets should be positioned so that each student has an unobstructed view of the screen. In summary, every effort should be made to insure that each student viewer does not have to work at hearing or seeing the television lesson, or have his concentration disrupted.

17. Receiver Maintenance and Repair. This element seems so obvious; yet, it is surprising how many schools broadcasting systems have no regular system of television set maintenance and repair. In too many classrooms is the television set standing in the corner gathering dust because the school supervisor has failed to see its defects repaired. It is foolhardy to spend major amounts of precious educational time, effort and money in planning and presenting the best possible television units of instruction, only to have the lessons dissipated because a receiver does not function. So frequently has this been a problem that maintenance and repair is included as a separate element. Each classroom teacher employing television should immediately report any receiver malfunction or problem to his supervisor. If a substitute set is unavailable, he should not rest until repairs are made and the receiver returned in working order. Each educational administrator under whose

jurisdiction television is employed should insist on adoption of a system for corrective and emergency maintenance, as well as a system for regular preventative maintenance. Further, he should urge that standby reception units be made available. The educational television process can break down at this critical point, if the classroom teacher, having designed his instruction around the television lesson, is at the last moment deprived of the telecast. Valuable instructional time will be lost, and television is labeled the villain.

18. The Student. The reason for and objective of all this planning and preparation -- our target audience, the student. He could be an Italian farmer learning to read in a remote mountain community center, a boy studying English in a Nigerian village school, an elementary teacher receiving instruction in the new mathematics in a rural Nebraska community, a teenage girl in Manila taught physics by a prominent college professor, a medical doctor in New York City keeping up-to-date in the ever-developing practice of medicine. For television is assisting in improving instruction for students at every level. And in large numbers.

In describing these elements which comprise successful schools televising, we have travelled quite a distance. We began with the educational need, centered upon a master teacher and the television origination system, transmitted the information, and moved to the reception process and the ultimate objective, the student. But our process is not quite complete. Two final elements are necessary.

19. Feedback to the Studio. The process is not quite complete when the television instruction is distributed and acknowledged by

the student. A means must be found to provide for the sampling of reactions and attitudes of the classroom teachers and of their students toward the television instruction. Are the lessons aimed at an appropriate level? Is the instruction appropriately paced, or too fast? Was today's lesson understood? Or should one portion be stressed again? Television teachers and producers cannot operate in a vacuum, hoping that instructional programs are hitting the mark.

Such sampling of opinions help in another way as well, for the feedback system means project involvement and participation.

A variety of procedures are used to enable the television teacher to know whether his lessons are effectively being received. Frequently, certain reception teachers are designated as responders and are regularly called upon to react to the televised instruction. The telephone is often used to feed back information from school buildings to the studio, if distances are not too great. Questionnaires and opinionaires are frequently devised by the studio teacher for response on a regular basis through the mails. With television recording equipment available at most production centers, it is quite possible for the television teacher to record certain lessons and spend the broadcast time at different classrooms securing first-hand reaction. Many school systems and educational broadcasting councils have full time utilization consultants who regularly visit schools and bring back reactions. The British Broadcasting Corporation calls such people Education Officers. The French use volunteer teachers to obtain reaction.

Whatever the system employed, a means must be devised for obtaining on a regular basis reaction to the television instruction. Otherwise improvement is hampered.

20. Research and Evaluation. The final element in this listing of facets of instructional television also is concerned with improvement. With an elaborate process such as schools television being employed, with a major administrative commitment necessitated, with large numbers of students involved, and with courses devised for possible use over a number of school terms, arrangements should certainly be made for systematic research and evaluation. All who are involved in the instructional television endeavor should continually assess the programming. In addition, educational measurement specialists, psychologists, and other researchers should be available to compare and test in relation to the stated educational need. In the majority of cases where a television course is planned for use over a number of semesters, lessons will be presented live through the first term, subjected to rigorous testing and evaluation, then repeated the second semester and recorded -- all this in the interest of quality teaching by television. Only if a system of educational research and evaluation is built into the project as a regular element can the fullest potential of educational television be achieved.

These, then, are the twenty elements of instructional television. Much more could be said about each; this paper does little more than summarize pertinent aspects.

Two other items which might be considered additional elements, time and money, were purposely not separately identified. Because

they pertain to so many of the facets innumerated, adequate time and monetary support are more appropriately included in other elements. It is almost redundant to state that without sufficient time and adequate financing, schools television cannot succeed.

Where have we come in our delineation of the elements necessary to successful instructional television? We have made a complete circle. We began by defining the educational problem which could be alleviated through the use of television, selected an experienced television teacher, gave him the best thinking of content and curriculum specialists, supported him with a good production staff, devised an appropriate television lesson, made full use of the television medium, distributed the signal over a quality system with the full support and approval of the general administrative agency and local administration, prepared and informed each classroom teacher using the lessons, arranged for television sets capable of producing quality signals, directed the programs to the student, fed reactions back to the studio where researchers and the television teacher worked to improve future instructional television in relation to the determined educational need. It makes no difference where one starts in listing the elements of an instructional television process, for, if the process is complete, in each case the lister would return to the same starting point. Each of these twenty elements is like a link in a continuous chain. If any of the links is missing, or is present but in weakened or spent condition, the chain is that much weaker and the continuity disrupted. So, too, with instructional television. Without each of these elements present and in appropriate

form, successful instructional television is difficult to achieve.

It is unfortunate that instructional television is so complicated. All our jobs would be the easier. But this is not the case. The mechanism with which we work to improve education is complicated. We should recognize this and react accordingly.

This listing is not submitted as a checklist -- nothing quite so simple. We cannot educate by formula. But hopefully the identification of these elements will enable the strengthening of an existing schools television program, or the better design of an initial effort. The potentials inherent in educational television are so great, we have such a marvelous tool at our command, that it is worth every effort to insure appropriate and successful use. With this in mind, I commend these twenty elements of instructional television to your consideration.